California Regional Water Quality Control Board
Santa Ana Region

December 20, 2004

Item: 16

Subject: Supplemental Staff Report: Proposed Basin Plan Amendment – Incorporation of Total Maximum Daily Loads for Nutrients for Lake Elsinore and Canyon Lake

On November 1, 2004, staff made available for public review a staff report that includes a discussion of proposed changes to the draft Lake Elsinore and Canyon Lake Nutrient total maximum daily loads (TMDLs) that were presented at public workshops on June 4, 2004 and September 17, 2004. Since the release of the November 1, 2004 staff report, staff has received input from the US Forest Service and Elsinore Valley Municipal Water District that warrants additional changes to the proposed TMDLs. This supplemental report describes these additional changes, which are shown in the Errata Sheet for the proposed Basin Plan amendment (Attachment to Resolution No. R8-2004-0037).

In summary, the proposed additional changes are:

- Deletion of the proposed final numeric targets and TMDLs for total phosphorus for Canyon Lake and Lake Elsinore. The proposed interim total phosphorus numeric targets and TMDLs for both Lakes would become the final targets/TMDLs. Compliance with the new final targets/TMDLs would continue to be required as soon as possible but no later than 2020.
- Revision of the nitrogen and phosphorus load allocations for forest/open space lands in the Canyon Lake TMDL.
- Revision of the nitrogen load allocation for forest/open space lands in the Lake Elsinore TMDL.
- Revision of the wasteload allocations for supplemental water in the Canyon Lake TMDL.
- Revision of the remaining wasteload and load allocations for nitrogen and phosphorus in the Canyon Lake TMDL to reflect the revised allocations for forest/open space and supplemental water.
- Revision of the remaining wasteload and load allocations for nitrogen in the Lake Elsinore TMDL to reflect the revised allocation for forest/open space.

<u>Revision of the Load Allocation for Forest/Open Space Lands</u>
Staff of the US Forest Service indicate that forest lands in the San Jacinto River Watershed are natural forest lands with little, or no, human disturbance. Therefore, they state that any nutrient loads emanating from the forest areas are natural and no reduction of these loads should be required. Forest Service staff provided data and information to support their position about the natural levels of nutrient runoff from non-anthropogenic sources. These data are presented in the Attachment to this Supplemental Staff Report. The data were drawn from publications on nitrogen and phosphorus export rates, including the US EPA Nutrient Criteria for Rivers and Streams in Ecoregion II (Western Forested Mountains) (US EPA, 2000), studies on forest land

nutrient export in the nation (Binley, 2001) and forest studies in Southern California (Meixner et al., 2003).

Based on a review of the data, staff agrees that the nitrogen load as simulated by the LSPC watershed model (and calibrated with field data) from the forest lands in the San Jacinto River/Lake Elsinore watershed is within the range of the nitrogen loads from natural forested watersheds in Southern California. Therefore, it is not reasonable to require reduction of that load, as originally contemplated in the proposed TMDLs. As proposed in the November 1, 2004 staff report, for Lake Elsinore, an 11% reduction in the nitrogen load was required to meet the final nitrogen TMDL, and for Canyon Lake a 18% reduction in the nitrogen load was required to meet the final nitrogen TMDL.

For phosphorus, staff compared the average phosphorus load from western forests (US EPA and Binley data sources (see the attached tables); no phosphorus load data for natural forest lands in Southern California is available at this time) with the phosphorus load from forest lands in the San Jacinto River watershed simulated by the LSPC model. The modeled phosphorus load from the forest land in the San Jacinto River watershed is higher than the median and/or average phosphorus load from other western forests in the US. It is unclear to staff if this is due to the fact that some human-induced disturbance is occurring on forested lands (i.e. septic systems, campgrounds, etc). Staff has asked US Forest Service staff to provide information on exact land uses within the lands under their jurisdiction. Until those data are obtained and reviewed, staff determined that a five percent reduction from the current San Jacinto River watershed forest land phosphorus load is needed to ensure that the phosphorus loads are within the range of other natural US forests. The proposed Canyon Lake TMDL previously incorporated a 56% and a 79% phosphorus reduction requirement from these lands to meet the interim and final TMDLs, respectively. For the Lake Elsinore interim phosphorus TMDL, no reduction from forest/open space lands was needed, and a 42% reduction from forest/open space lands was required to meet the proposed final Lake Elsinore phosphorus TMDL.

The proposed revisions to the forest/open space nitrogen and phosphorus allocations lead to recommended changes to the phosphorus numeric targets, phosphorus TMDLs and nitrogen and phosphorus allocations for other dischargers, as discussed below.

Revision of the TMDL Numeric Targets

As indicated in the preceding section, staff proposes to revise the load allocations for the forest/open space lands in the San Jacinto River/Lake Elsinore watershed: no nitrogen reduction would be required and a 5% phosphorus reduction in loads entering Canyon Lake would be required.

Modification of the proposed Canyon Lake final phosphorus TMDL to include a 5% reduction in the forest/open space load would result in a phosphorus load allocation for forest/open space that is about the same as the external phosphorus load capacity (2,037 kg/yr versus 2,064 kg/yr, respectively). This means that there would be no phosphorus load allocations available for other sources. In staff's opinion, this is not reasonable. Therefore staff proposes to delete the final total phosphorus numeric target (and the final total phosphorus TMDL (see below)) for Canyon Lake. Instead, staff recommends that the interim phosphorus numeric target be used as the final target, with compliance to be achieved as soon as possible but no later than 2020. For consistency, staff also recommends that the interim phosphorus numeric target for Lake Elsinore be used as the final target, with compliance to be achieved also no later than 2020. These proposed changes are shown in the errata sheet (Table 5-9n).

<u>Revision of the Nitrogen and Phosphorus TMDLs</u>
As a result of the proposed changes to the TMDL numeric targets for phosphorus, the interim total phosphorus TMDLs become the final total phosphorus TMDLs for Lake Elsinore and Canyon Lake. The revised TMDLs are shown in the errata sheet (Table 5-9p). Again, the compliance date is as soon as possible, but no later than 2020.

<u>Revision to the WLAs for Supplemental Water to Canyon Lake</u>
Elsinore Valley Water District staff (EVMWD) expressed concerns about the Canyon Lake supplemental water allocations. In the past, EVMWD has added Colorado River water to Canyon Lake that has been relatively phosphorus free. However, EVMWD has indicated that in additon to the Colorado River, supplemental water to Canyon Lake may also come from the State Water Project. Further, EVMWD has indicated that the volume of supplemental water will also increase up to 10,000 ac-ft per year. EVMWD wants to ensure that the use of supplemental water from all likely sources is accounted for and in compliance with the Canyon Lake nutrient TMDL.

EVMWD provided water quality data for each of these sources of supplemental water. Originally, the Canyon Lake supplemental water WLA was calculated based on the water quality data for the Colorado River water, and the volume of water added to Canyon Lake in April 2002 (1,006 ac-ft). In order to reflect the operational options available to EVMWD, staff proposes to use the average nitrogen and phosphorus water quality of all the available sources (TN = 0.3 mg/L, TP = 0.04 mg/L) and to assume the same amount of water addition (1,006 ac-ft a year). Even though the amount of supplemental water added may increase to 10,000 ac-ft, it is expected that the same amount of water would be withdrawn from Canyon Lake for treatment and delivery. Therefore, staff does not see this as a permanent addition of water to Canyon Lake.

<u>Revision to the load allocations (LAs), and waste load allocations (WLAs) for the Lake Elsinore and Canyon Lake Nutrient TMDLs</u>
As a result of the recommended revisions to the nitrogen and phosphorus load allocations for forest/open space and the wasteload allocations for supplemental water inputs to Canyon Lake, the allocations for other sources have to be adjusted to meet the TMDLs (load capacity). Specifically, as shown in Table 1 in the attachment, wasteload allocations for point source dischargers and load allocations for nonpoint source dischargers need to be reduced further from those specified in the November 1, 2004 staff report. Similarly, revision of the nitrogen load allocation for forest/open space in the Lake Elsinore TMDL necessitates redistribution of the load/wasteload allocations among the other sources (see Table 1 in the attachment).

The revised WLAs and LAs are shown in the errata sheet (Tables 5-9q and 5-9r).

Staff Recommendation

Adopt Resolution No. R8-2004-0037, amending Chapter 5 of the Basin Plan to incorporate the nutrient TMDLs for Lake Elsinore and Canyon Lake shown in the Attachment to the Resolution, as amended by Errata Sheet No. 1.

References

US EPA, 2000. Ambient Water Quality Criteria Recommendations. Information Supporting the Development of Sate and Tribal Nutrient Criteria: Rivers and Streams in Nutrient Ecoregion II. EPA 822-B-00-15

Binley, 2001. Patterns and Processes of Variation in Nitrogen and Phosphorus Concentrations in Forested Streams. NCASI Technical Bulletin No. 836.

Meixner T., Fenn M.E., and Wohlgemuth P.M., 2003. Fire Disturbance and Nitrogen Deposition Impacts at the Watershed Scale in Southern California.

Attachment

Table 1. Revised TMDL Allocation for Lake Elsinore and Canyon Lake to meet the revised final TP and TN targets (TP target: 0.1 mg/L, TN target: 0.75 mg/L; to be met as soon as possible but no later that 2020)

Lake Elsinore						
	Phosphorus Load Allocation (kg/yr)	Existing TP Load (kg/yr)	Reduction (%)	Nitrogen load Allocation (kg/yr)	Existing TN load (kg/yr)	Reduction (%)
TMDL	**28,584**	**48,582**	41	**239,026**	**271,206**	12
WLA	3,845	15,007		7,791	60,138	
Supplemental water*	3,721	14,883	75	7,442	59,532	87
Urban	124	124	0	349	606	42
CAFO	0	0		0	0	
LA	21,969	33,575		210,461	211,068	
Internal Sediment Source	21,554	33,160	35	197,370	197,370	0
Atmospheric Deposition	108	108	0	11,702	11,702	0
Agriculture	60	60	0	213	371	42
Open/Forest	178	178	0	567	567	0
Septics	69	69	0	608	1,058	42
Canyon Lake Watershed	2,770			20,774		
MOS	0			0		

Canyon Lake						
	Phosphorus Load Allocation (kg/yr)	Existing TP Load (kg/yr)	Reduction (%)	Nitrogen load Allocation (kg/yr)	Existing TN load (kg/yr)	Reduction (%)
TMDL	**8,691**	**13,558**	36	**37,735**	**46,124**	18
WLA	487	1,636		6,248	8,942	
Supplemental water#	48	48	0	366	366	0
Urban	306	1,142	73	3,974	5,794	31
CAFO	132	494	73	1,908	2,783	31
LA	8,204	11,922		31,487	37,182	
Internal Sediment Source	4,625	4,625	0	13,549	13,549	0
Atmospheric Deposition	221	221	0	1,918	1,918	0
Agriculture	1,183	4,414	73	7,583	11,057	31
Open/Forest	2,037	2,144	5	3,587	3,587	0
Septics	139	518	73	4,850	7,071	31
MOS	0			0		

* The existing TN and TP loads for the supplemental water only considered the recycled water. The existing load was calculated by using a volume of 6050 AFY and TP of 2 mg/L and TN of 8 mg/L.

\# The source of the supplemental water to Canyon Lake can be State Water Project or Colorado River Water. The average of the TP and TN concentration from the data submitted by EVMWD was used to calculate the WLA.

Comparison of Nitrogen and Phosphorus Loads from the Forest and Open Space in the SJR Watershed as Simulated by the LSPC model

and Literature Values
(From EPA nutrient Criteria for Ecoregion II, Binley, 2001, and Meixner et al., 2003)

	Existing Load				Proposed Allocation	
TN	**3586**	kg/yr	**0.027**	kg/ha/yr	1652	kg/yr
TP	**2144**	kg/yr	**0.016**	kg/ha/yr	453	kg/yr

Forest/open area i 133,336 ha

Comparison to published nitrogen export rates		Conc (mg/l)	Ave Annual Flow rate (ft^3/s)	Ave Annual Flow rate (l/s)	Mass Loading (mg/s)	Mass Loading (mg/yr)	Mass Loading (kg/yr)
N criteria, Ecosystem II	EPA	0.12	20	562	67.44	2126787840	**2126.79**
Median N conc, all U.S. forests	Binkley	0.4	20	562	224.8	7089292800	7089.29
N export (low range), control watershed on San Din	Meixner et al		20	562			
Ave N conc, all U.S. forests	Binkley	0.52	20	562	292.24	9216080640	9216.08
Median N conc, all coniferous western forests	Binkley	0.54	20	562	303.48	9570545280	9570.55
Median N conc, western forests	Binkley	0.54	20	562	303.48	9570545280	9570.55
Median N conc, all forests, igneous	Binkley	0.55	20	562	309.1	9747777600	9747.78
Ave N conc, all coniferous western forests	Binkley	0.56	20	562	314.72	9925009920	9925.01
Ave N conc, all forests, igneous	Binkley	0.62	20	562	348.44	10988403840	10988.40
Ave N conc, western forests	Binkley	0.66	20	562	370.92	11697333120	11697.33
Esimate based on measured N deposition rated in SI	Fenn		20	562			
Esimate based on measured N deposition rated in SI	Fenn		20	562			
N export (high range), control watershed on San Dir	Meixner et al		20	562			

*Except where noted, all values are for the combined sum of NO3, NH4, and organic N.

Comparison to published phosphorus export rates

		Conc (mg/l)	Ave Annual Flow rate (ft^3/s)	Ave Annual Flow rate (l/s)	Mass Loading (mg/s)	Mass Loading (mg/yr)	Mass Loading (kg/yr)
P criteria, Ecosystem II	EPA	0.01	20	562	5.62	177232320	**177.23**
Median P conc, all forests, igneous	Binkley	0.045	20	562	25.29	797545440	797.55
Median P conc, western forests	Binkley	0.0475	20	562	26.695	841853520	841.85
Median P conc, all U.S. forests	Binkley	0.04875	20	562	27.3975	864007560	864.01
Median P conc, all coniferous forests	Binkley	0.04875	20	562	27.3975	864007560	864.01
Ave P conc, all forests, igneous	Binkley	0.1075	20	562	60.415	1905247440	1905.25
Ave P conc, western forests	Binkley	0.115	20	562	64.63	2038171680	2038.17
Ave P conc, all coniferous forests	Binkley	0.1175	20	562	66.035	2082479760	2082.48
Ave P conc, all U.S. forests	Binkley	0.12	20	562	67.44	2126787840	2126.79

*Includes dissolved organic P and inorganic P, plus an additional 20% assumed particulate P loading (see Binkley).